SPUTTER PENNING ION SOURCE

Model SO-90

Features

- Easy operation and maintenance
- Low power consumption
- Long lifetime
- Low beam emittance
- High brightness

General description

The HVEE Model SO-90 Sputter Penning ion source will ionize almost all conducting solids whose melting point is not too low, including those with a very low vapor pressure such as tungsten and tantalum.

In this source the cathodes are made from the element to be ionized. Positive ions from an argon or neon plasma discharge hit the cathodes and sputter the required material into the plasma. The special source geometry results in a high density of sputtered material in the plasma and a low deposition rate of unionized sputtered materials.

Spare parts to cover the first needs are included with each SO-90 ion source.

Other types of penning ion sources available from High Voltage Engineering Europa B.V. are:
- The Model SO-60 Cold Cathode Penning ion source
- The Model SO-100 Hot Cathode Penning ion source

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SPECIFICATIONS

* Typical beam currents measured by a HVEE customer in a Faraday cup located just after the vacuum rack of a 500kV HVEE ion implantation system for energies between 80-500kV and with 30kV extraction voltage

Ion	Carrier	Current (μA)	Ion	Carrier	Current (μA)
^{20}Ne	Ne	160	$^{107}Ag^{+}$	Ne	20
$^{52}Cr^{+}$	Ne	21.5	$^{197}Au+$	Ar	14
$^{52}Cr^{++}$	Ne	8	$^{165}Er^{+}$	Ne	15
^{40}Ar	Ar	80	$^{165}Er^{++}$	Ne	10
$^{52}Cr^{+}$	Ar	20	$^{165}Er^{+++}$	Ne	1.4
$^{52}Cr^{++}$	Ar	4	$^{165}Er^{+}$	Ar	10.2
$^{52}Cr^{+++}$	Ar	0.6	$^{165}Er^{++}$	Ar	3.6
$^{56}Fe^{+}$	Ne	8	$^{165}Er^{+++}$	Ar	0.6
$^{56}Fe^{++}$	Ne	4			
$^{70}Ge^{+}$	Ne	3.5			
$^{72}Ge^{+}$	Ne	4.7	Also ion beams with Oxygen, Xenon or Krypton carriers can be performed, but the ion beam current output is in general lower.		
$^{74}Ge^{+}$	Ne	6.3			
$^{27}Al^{+}$	Ne	50			
$^{27}Al^{++}$	Ne	10			

POWER REQUIREMENTS

Anode power supply : 2 kV / 20 mA DC to approx. 500 V / 500 mA DC
Magnet power supply : 10 V / 20 A DC
Extraction power supply : 10 - 30 kV / 5mA DC
Cooling : 50 m^3 air per hour

The Model SO-90 Sputter Penning Ion Source normally operates at +/- 30 kV with respect to (terminal) ground. Therefore the source must be insulated from (terminal) ground. The source power supplies must be connected to a 30 kV isolation transformer.